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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HICKMAN PALERMO TRUONG & BECKER, LLP
2055 GATEWAY PLACE
SUITE 550
SAN JOSE, CA 95110

EXAMINER

SETLAK, ANDREW T

ART UNIT	PAPER NUMBER
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2166

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/643,563	Applicant(s) LI ET AL.	
	Examiner Andrew Setlak	Art Unit 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/5/2004-1/27/200</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

Applicant is reminded that in order for claims 11-22 to be in proper dependant form claim numbering conventions should be observed. As presented it appears as though each of claims 12-22 are written in independent form. It is clear from the fee worksheet however, that this was not the intention of the applicant.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 recites the limitation "the second first occurrence counting technique" in page 41 line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1-22 do not appear to produce a useful, concrete *and* tangible result. The examiner does not see either the practical application required in order to meet the useful requirement of the result of a claim as required under 35 U.S.C. § 101 nor the tangible result aspect embodied in claims 1-22.

Further, if the “acts” of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. *Benson*, 409 U.S. at 71-72, 175 USPQ at 676. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

Further, claims 12-22 appear to encompass transmission media within their scope as evidenced by ¶ 143-145 of the specification. Thus, claims 12-22 are also rejected under 35 U.S.C. §101 as being directed to the non-statutory area of signals embodied on a transmission medium.

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. *O'Reilly*, 56 U.S.

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(15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101.

First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents § 1.02 (1994). The three product classes have traditionally required physical structure or material.

"The term machine includes every mechanical device or combination of mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." *Corning v. Burden*, 56 U.S. (15 How.) 252, 267 (1854). A modern definition of machine would no doubt include electronic devices which perform functions. Indeed, devices such as flip-flops and computers are referred to in computer science as sequential machines. A claimed signal has no physical structure, does not itself perform any useful, concrete and tangible result and, thus, does not fit within the definition of a machine.

A "composition of matter" "covers all compositions of two or more substances and includes all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." *Shell Development Co. v. Watson*, 149 F. Supp. 279, 280, 113 USPQ 265, 266 (D.D.C. 1957), *aff'd*, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958). A claimed signal is not matter, but a form of energy, and therefore is not a composition of matter.

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The Supreme Court has read the term "manufacture" in accordance with its dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." *Diamond v. Chakrabarty*, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which, in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See *American Disappearing Bed Co. v. Arnaelsteen*, 182 F. 324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which a claimed signal does not have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. *Lorillard v. Pons*, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in *American Fruit Growers* when it passed the 1952 Patent Act.

A manufacture is also defined as the residual class of product. 1 Chisum, § 1.02[3] (citing W. Robinson, *The Law of Patents for Useful Inventions* 270 (1890)).

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A product is a tangible physical article or object, some form of matter, which a signal is not. That the other two product classes, machine and composition of matter, require physical matter is evidence that a manufacture was also intended to require physical matter. A signal, a form of energy, does not fall within either of the two definitions of manufacture. Thus, a signal does not fall within one of the four statutory classes of § 101.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 9-18 & 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,324,533 (henceforth referred to as Agrawal et al.).

Claim 1 is anticipated by Agrawal et al. as follows: **A method for performing a frequent itemset operation, the method comprising the steps of: dynamically selecting which occurrence counting technique to use from a plurality of available occurrence counting techniques (C3:L19-21); and during said frequent itemset operation, using said selected occurrence counting technique to count occurrences of at least one combination to determine whether said at least one combination satisfies frequency criteria associated with said frequent itemset operation (C3:L23-24).**

Claim 2 is anticipated by Agrawal et al. as in claim 1, wherein: **the frequent itemset operation is performed in a plurality of phases, wherein each phase is associated with combinations that have a particular number of items (C5:L32-34); the step of dynamically selecting includes dynamically selecting which occurrence counting technique to use for at least one phase of said plurality of phases (C3:L19-21); and the step of using includes using said selected occurrence counting technique to determine whether candidate combinations for said at least one phase satisfy said frequency criteria (C3:L23-24).**

Claim 3 is anticipated by Agrawal et al. as in claim 2, wherein: **said at least one phase is a phase during which combinations having N items are processed (C3:L17-19); a first occurrence counting technique is selected for said phase of said frequent itemset operation (C3:L19-21); the method includes dynamically selecting a second occurrence counting technique in the phase of a subsequent frequent itemset operation during which combinations having N items are**

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processed (C3:L17-21; C15:L1-5); and the second first occurrence counting technique is different from said second occurrence counting technique (C3:L17-24).

Claim 4 is anticipated by Agrawal et al. as in claim 1, **wherein the step of dynamically selecting which occurrence counting technique includes generating cost estimates for each occurrence counting technique of said plurality of available occurrence counting techniques, and selecting the occurrence counting technique that has the lowest estimated cost (C3:L20).**

Claim 5 is anticipated by Agrawal et al. as in claim 4, **wherein the step of generating cost estimates includes generating a cost estimate for at least one of said available occurrence counting techniques based on an estimated I/O cost of using the occurrence counting technique (C12:L34-37).**

Claim 6 is anticipated by Agrawal et al. as in claim 4, **wherein the step of generating cost estimates includes generating a cost estimate for at least one of said available occurrence counting techniques based on an estimated CPU cost of using the occurrence counting technique (table 1, group(n,m), join(n,m,r), Sk, these are known to be CPU limited performance factors; C12:L19-20).**

Claim 7 is anticipated by Agrawal et al. as in claim 4, **wherein the step of generating cost estimates includes generating a cost estimate for at least one of said available occurrence counting techniques based on a total cost that includes a plurality of weighted constituent costs (C11:L37-C12:L20).**

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Claim 9 is anticipated by Agrawal et al. as in claim 1, **wherein the step of dynamically selecting includes dynamically selecting based on conditions existing in a computing environment in which the frequent itemset operation is to be performed (C12:L21-32).**

Claim 10 is anticipated by Agrawal et al. as in claim 9, **wherein the conditions include one or more of workload of a computer system executing the frequent itemset operation; and resources available on said computer system (C11:L17-33).**

Claim 11 is anticipated by Agrawal et al. as in claim 2, **further comprising the step of determining that a particular occurrence counting technique will not be considered during any phase of the frequent itemset operation, and performing the frequent itemset operation without performing startup operations for said particular occurrence counting technique (C11:L40-44).**

Claims 12-18 & 20-22 are anticipated by Agrawal et al. using the same rationale as applied to claims 1-7 & 9-11.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 & 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Agrawal et al. and the paper *High Performance Mining of Maximal Frequent Itemsets* written by Gösta Grahne and Jianfei Zhu (henceforth referred to as Grahne & Zhu).

Claims 8 & 19 are taught by Agrawal et al. as in claims 1 & 12. However, Agrawal et al. does not explicitly indicate that **the plurality of available occurrence counting techniques include a bitmap intersection technique and a prefix tree technique**. However, Grahne & Zhu teaches that **the plurality of available occurrence counting techniques include a bitmap intersection technique and a prefix tree technique** (Grahne & Zhu: page 2, § 1 Introduction, ¶ 5; page 3, § 2.1 FP-Tree and FP-Growth Method, ¶ 2).

One of ordinary skill in the art at the time of invention would have recognized that the methods disclosed in Grahne & Zhu comprise the details of a subset of the method taught by Agrawal et al. It would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal et al. and Grahne & Zhu because they are both focused on knowledge within the domain of data mining. Specifically, Grahne & Zhu state on page 10 § 4 ¶ 1 that their “paper studies the performance of algorithms for mining frequent itemsets,” which would clearly be of importance to the frequent itemset mining stage of the association rule mining method of Agrawal et al. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to have combined the teachings of Agrawal et al. and Grahne & Zhu.

Information Disclosure Statement

Applicants' Information Disclosure Statements, filed on 1/27/2006, 10/17/2005, 8/17/2005, 1/3/2005, 12/2/2004, 10/22/2004, 10/8/2004 & 10/5/2004 have been received, entered into the record, and considered. See attached PTO-1449 forms.

Conclusion

The prior art made record of on form PTO-892 and not relied upon is considered pertinent to the applicants' disclosure.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Setlak whose telephone number is (571) 272-4060. The examiner can normally be reached on M-F 10:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Andrew Setlak
Patent Examiner
03/30/2006



Hosain Alam
Supervisory Patent Examiner